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Big Sky Clearwater

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Winter 1982/1983

Annual Conference Issue

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Lagoon Repairs

Story Inside

"We've had jobs diving in fluids that are much more offensive"

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Divers Do It in the Lagoon

Most folks find it hard to believe that Northwest Underwater Inc., a successful commercial diving operation, is located in Whitefish, Montana. These divers obviously don't dive in the ocean much, and surprisingly enough they don't spend a lot of time in lakes or streams either. "About 80% of our jobs involve repairing aerated lagoon systems for towns and companies..." according to Shag Scheidecker, Senior Dive Officer for the company.

Shag operates the business with two other divers, John Hereen and Diann Ferris. Diann is one of the few working woman divers in the country. The three divers together boast over 40 years of diving experience, and they are skilled in many aspects of commercial diving including underwater bridge construction, dam inspections, welding and cutting, pipe laying, salvage etc.

The interesting thing about these divers, is the water in which they do the majority of their work. It turns out that they are among a very few people who find it reasonable to swim in wastewater. It is amazing that they are able to work in the total darkness at the bottom of a lagoon and get the job done.

You probably know of someone who has taken an unplanned dip in a clarifier or a wastewater lagoon, but these divers' swims are planned, very well planned. The divers wear astronaut-like dry suits which completely protect them from the hostile wastewater environment. They go through an extensive decontamination process after each dive and they are given frequent physical exams "no one has ever been sick" explains Shag, "We've had jobs diving in fluids that are a lot more offensive psychologically than wastewater."

WATER POLLUTION CONTROL FEDERATION
1928

The Big Sky Clearwater--for water and wastewater-treatment operators across Montana--is published two times a year by the Water Quality Bureau of the State Department of Health and Environmental Sciences in cooperation with the Montana Section American Water Works Association and the Montana Water Pollution Control Association.

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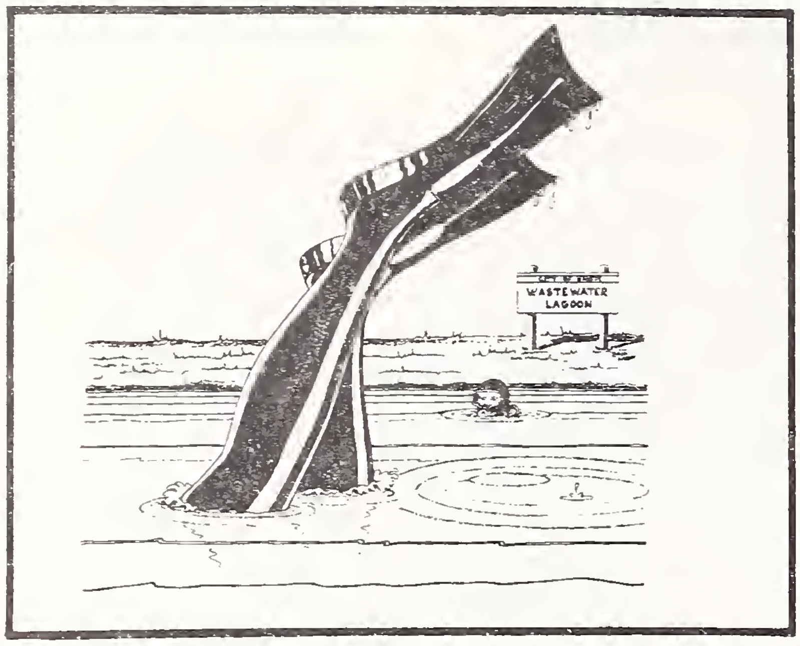

Last winter, the town of Eureka was having problems with the aeration equipment in their lagoons. Ice on the lagoons was causing the problems and someone was needed to go below the surface and fix the equipment. This summer another lagoon, in Polson, was clogging up with algae. They also needed a crew to pull out part of the aeration system and make necessary repairs. In each case the crew was Northwest Underwater. The latest lagoon system repair completed by these adventurous divers was done under the ice in the Whitefish lagoons. Shag describes how he got cramps in his arms pulling himself along the air lateral pipes in the bottom of the lagoon. "The sludge was so thick that we couldn't get a bucket full of lead to sink in it."

There's a certain amount of snickering when Shag tells people what he does for a living, but making better than $40.00 an hour, he can swallow a lot of ridicule and laugh all the way to the bank. "It usually runs about $1000.0 a day for the services of all three divers" according to Shag. "Most jobs take about 4 to 5 days. "In many instances, folks have found that it is much less expensive to have us troubleshoot, retrofit, or repair a system, than the traditional pumping and refilling methods used."

Northwest Underwater Inc. has been providing its unique services to Montanans for about three years now. They work at diving full-time. For further information contact:

Northwest Underwater Inc.
P.O. Box 1773
Whitefish, MT 59937

Phone: (406)862-5931

"Couldn't we claim the right of prior usage in that we've been dumping our waste into the river far longer than anybody else?"

Spring Conference in Bozeman

The Joint Conference of the Montana Section of the American Water Works Association (MSAWWA) and the Montana Water Pollution Control Association (MWPCA) will be held on March 24 and 25 at the Holiday Inn in Bozeman.

Tours of the Bozeman Wastewater Treatment Plant (now under construction) and the Environmental Engineering Laboratories at Montana State University are planned for the afternoon preceding the Conference. A ladies program with the history of Bozeman and Gallatin Valley as its focus will coincide with the Conference. The technical program is a mix of sessions for engineering, management and operation. Some of the major themes of the Conference sessions are: Contracts and Management, Biofilms, Sludge Treatment and Disposal, and Computers.

The Conference precedes Bozeman's Centennial Birthday on March 26, 1983 and several centennial celebration events are scheduled in Bozeman for the week-end following the Conference.

The Holiday Inn is located at 5 Baxter Lane in Bozeman, phone (406)587-4561. They are offering a special room rate for the conference of $30.00 per night for a single adult and $35.00 per night for two.

Other motels in the area include:

Name	Address	Telephone	Rate Single	Rate Double
Ramada Inn	1325 North 7th Avenue, Bozeman	(406)587-5261	$30	$35
Thrifty Scot Motel	1321 North 7th Avenue, Bozeman	(800)228-3222	19	28
Super 8 Motel	800 Wheat Dr., N. 7th Ave, Bozeman	(800)843-1991	20	26
Royal 6 Motel	310 North 7th avenue, Bozeman	(406)587-3103	19	26
Topper Motel	1235 N. 7th Avenue, Bozeman	(406)587-3176	22	28

Tentative Programs

Wednesday, March 23, 1983

1:00 P.M. - 3:00 P.M.	Tour of the Bozeman Wastewater Treatment Plant
3:00 P.M. - 5:00 p.m.	Tour of the Environmental Engineering Laboratories at Montana State University

Thursday, March 24, 1983

10:00 A.M.	Energy Conservation in Water and Wastewater	Ed Schleinger Larry Walter Bud Heiser
10:40 A.M.	Water Loss Reduction Reduction of water loss in distribution systems and resulting revenue increase.	James Smith
11:20 A.M.	The Treatment Plant Operator - Provider and Protector of a Precious Resource Discussion about the duties of water or wastewater operators emphasizing the important role they play and the need to provide them with adequate training.	Tim Hunter

MSAWWA and MWPCA to Meet in Bozeman (cont'd)

12:00 P.M.	Lunch WPCF Report by the President of WPCF	Charles Jones

Session 1

1:30 P.M.	Polymer Types and Usages in Water and Wastewater	Pat Lohse
2:15 P.M.	Computer Analysis of Water Distribution Systems	William Hunt
3:00 P.M.	Break	
3:15 P.M.	Characteristics and Kinetics of Biofilms The structure and metabolism of biofilms are summarized.	William Characklis
4:00 P.M.	Rotating Biological Contractor System The experiences of the first year of operation at the Livingston, Montana RBC plant.	John Connell
4:15 P.M.	Activated Bio Tower System Operational experiences of the Helena, Montana facility	Jan Cranor
4:30 P.M.	Biofilms and Stream Self-Purification Study of waste assimilation by biofilms in the East Gallatin below the Bozeman Wastewater Treatment Plant.	A. Mirtharajah

Session II

1:30 P.M.	Pros and Cons of Contract Operations Contracting the operation of a water or wastewater facility	Dave Brown
2:15 P.M.	Owner's Responsibility The heart of EPA's municipal compliance policy	Dick Montgomery Bob Fox
3:00 P.M.	Break	
3:15 P.M.	Psychology of Planning How to make planning useful	James Lee
4:00 P.M.	The Minicomputer and Management Management of inventories and scheduling of preventive maintenance with desk top computers.	John Hanton

FRIDAY, March 25, 1983

Session I

8:00 A.M.	Water Utilities Accounting	Carl Christensen
8:45 A.M.	Structures of Organization for Water Systems How to form a water users association, water district, etc.	
9:30 A.M.	Applications of Electronic Instrumentation Overview of electronic control in water system instrumentation	Gene Weinberger
10:15 A.M.	Break	
10:30 A.M.	Construction Management Keeping everyone accountable during the construction of a municipal facility	Mark Weston

11:30 A.M.	Lunch	

Session II

8:00 A.M.	Aerobic Sludge Treatment Operational advantages and disadvantages with aerobic digestion	Fred Wendt
8:35 A.M.	Anaerobic Sludge Treatment Operational advantages and disadvantages with anaerobic digestion	Ray Armstrong
9:15 A.M.	Land Application - Bozeman Bozeman's concerns and plans for sludge injection	Gary Hendrix
9:45 A.M.	Land Application - Helena Helena's experience with sludge injection	Alden Beard
10:30 A.M.	*Giardia* Removal Red Lodge pilot plant study	Mike Alberi
11:30 A.M.	Lunch AWWA Report by the Past President of AWWA	Kenneth J. Miller

Joint Session

1:00 P.M.	Water and Wastewater - The Political Arena Public official discusses the ramifications of current laws and climate of government regulations toward the field	Max Baucus
1:45 P.A.	Sources of Funding for Water and Wastewater Facilities Funding available from Farmers Home Administration, Department of Natural Resources and Conservation, Department of Commerce (Block Grants) and Department of Health and Environmental Sciences (Construction Grants)	Ted Hebness Mark O'Keefe David Cole Joe Steiner

Ladies Program

THURSDAY, March 24, 1983

9:00 A.M.	Continental Breakfast, poolside - Holiday Inn
10:30 A.M.	Bus leaves Holiday Inn for Tour of Historic Bridger Canyon
12:00 P.M.	Lunch at the Crosscut Ranch After lunch lecture: "Women in History" by Dr. Paula Petrik, Assistant Professor of History, Montana State University
3:30 P.M.	Bus returns to Holiday Inn
6:00 P.M.	No-host Cocktails, Ballroom - Ramada Inn
7:00 P.M.	Get Acquainted Dinner Party, poolside - Ramada Inn

FRIDAY, March 25, 1983

9:00 A.M.	Continental Breakfast, poolside - Holiday Inn
10:00 A.M.	Historic site-seeing bus tour of the old homes in Bozeman and visit to the Museum of the Rockies
11:30 A.M.	Lunch, poolside - Holiday Inn
2:00 P.M.	Shopping and Gallery Tour of Downtown Bozeman
6:00 P.M.	No-host Cocktails, lobby - Holiday Inn
7:00 P.M.	Banquet - Awards - Dance, poolside and MSU rooms - Holiday Inn

Realistic Sludge Production

Coefficient for Activated Sludge

By: Jim Schultz, P.E.,
Operations Engineer
M&I, Inc., Consulting Engineers
Fort Collins, Colorado

Many reasons have contributed to poor performance from a large percentage of activated sludge wastewater treatment plants. However, a general misconception regarding sludge production seems to be the underlying basis for many of the design and operational problems. This is especially true of small activated sludge plants without primary clarifiers. These plants include extended aeration, contact stabilization, oxidation ditches, and some conventionally sized aeration basins. Designers typically do not anticipate realistic sludge production values which leads to inadequate sludge handling facilities, misinformation provided in O & M manuals, and often times poor plant performance.

Operators and engineers can avoid many problems by calculating sludge production coefficients for operating activated sludge plants. The sludge production coefficient describes the mass of total suspended solids (sludge) produced in the process per mass of BOD_5 removed, or lb TSS/lb BOD_R. The mass of BOD_5 removed is calculated using influent and effluent total BOD_5 results. In calculating sludge production, three components are included: sludge intentionally wasted, sludge lost as effluent suspended solids, and changes in the sludge inventory within the activated sludge system.

Effluent suspended solids are considered since differing effluent qualities introduce an unnecessary variable into the evaluation. Accounting for effluent sludge does lend consistency to sludge production calculations, but does

This Newsletter Needs Your Help

The Big Sky Clearwater is seeking articles from people all across Montana who are working in the water and wastewater fields. After all, this newsletter is supposed to be a communications link between operators, so it's only natural that some of our stories should be written by operators (also by consultants, engineers or anyone else who has an experience, mechanical problem or project to share with others).

We're a bi-annual publication, that means twice a year, and articles can be submitted by about July 1 or December 1 depending on the issue to the Editor, Big Sky Clearwater, Water Quality Bureau, Department of Health and Environmental Sciences, Room A206 Cogswell Building, Helena, MT 59620.

Or better yet, if you have an idea for a story, give the editor, Tim Hunter, a call at 449-2406 and discuss it with him. He'd be happy to give you a hand in writing the story if you're the kind of writer who's still wondering why typewriter keys aren't in alphabetical order.

Also, feel free to write Letters to the Editor. We'll publish them, if you wish.

not accurately describe actual sludge wasting requirements. Therefore, a second term called the sludge wasting coefficient can also be calculated. When operating at optimum, the sludge handling coefficient approaches the sludge production coefficient because little sludge is lost in the plant effluent.

Figure 1

____

Month ______________ No. Days ______

	Flow	BOD in	BOD out	TSS in	TSS out
	___	___	___	___	___
Avg.					

	Ratio	su/lb	WAU	lb Wasted	TSU	___
	___	___	___	___	___	___
Avg. of Total						

TSU at end of this month _____

TSU at end of last month _____

BOD removed ________lb.

	Sludge Production	Sludge Handling
Sludge Wasted	____ lb	____ lb
Effluent Sludge	____ lb	
Additional Sludge in Plant	____ lb	____ lb

Sludge Production:

_______ lb sludge/month ______ lb BOD_R =

Sludge Handling:

_______ lb sludge/month ______ lb BOD_R =

A work sheet which has been used to calculate sludge production and handling coefficients is shown in figure 1. Actual data for July, 1981 from the Marshfield, Missouri extended aeration plant illustrates the calculation in Figure 2. Cumulative data for over three years, at this plant has shown that on the average, 0.64 lb TSS are produced per pound of BOD_5 removed. During that same period monthly coefficients have varied from 0.25 to 1.2 lb TSS/lb BOD_R.

The long term average combined with actual variations in sludge production provide a realistic basis for determining sludge wasting and handling requirements at Marshfield. All activated sludge plants should have similar data available since the parameters required to calculate the sludge production coefficients are also necessary to operate any plant. The complexity of the sampling program and the frequency of analysis will of course vary with the complexity and size of the facility.

Long term sludge production and sludge handling coefficients for sixteen plants are shown in

Figure 2

Marshfield, Mo.

Month July 1981 No. Days 28.

	Flow	BOD in	BOD out	TSS in	TSS out
	.513	176	3.5	180	3.5
	.630	180	4.7	110	2.5
	.503	120	4.2	103	2.5
	.534	132	2.3	297	.5
Avg.	.560	152	3.7	172	2.2

	Ratio	su/lb	WAU	lb Wasted	TSU	___
	761		433000			
	818		334,000			
	763		346,000			
	766		439,000			
Avg. of Total	777	154.4	1,552,000	19052		

TSU at end of this month 2,143,000

TSU at end of last month 2,101,000

BOD removed 19,354 lb.

	Sludge Production	Sludge Handling
Sludge Wasted	10,052 lb	10,052 lb
Effluent Sludge	288 lb	
Additional Sludge in Plant	233 lb	233 lb
	10,537	10,285

Sludge Production:

10,573 lb sludge/month 19,354 lb BOD_R = .55

Sludge Handling:

10,285 lb sludge/month 19354 lb BOD_R = .53

(cont'd)

Figure 3, along with values (horizontal lines) typically used for sizing sludge handling facilities. The large discrepancy between anticipated and actual sludge production illustrates the basis for many of the problems in achieving good performance from activated sludge facilities. A good starting point in an effort to reverse this trend is to actually calculate sludge production coefficients in all activated sludge plants.

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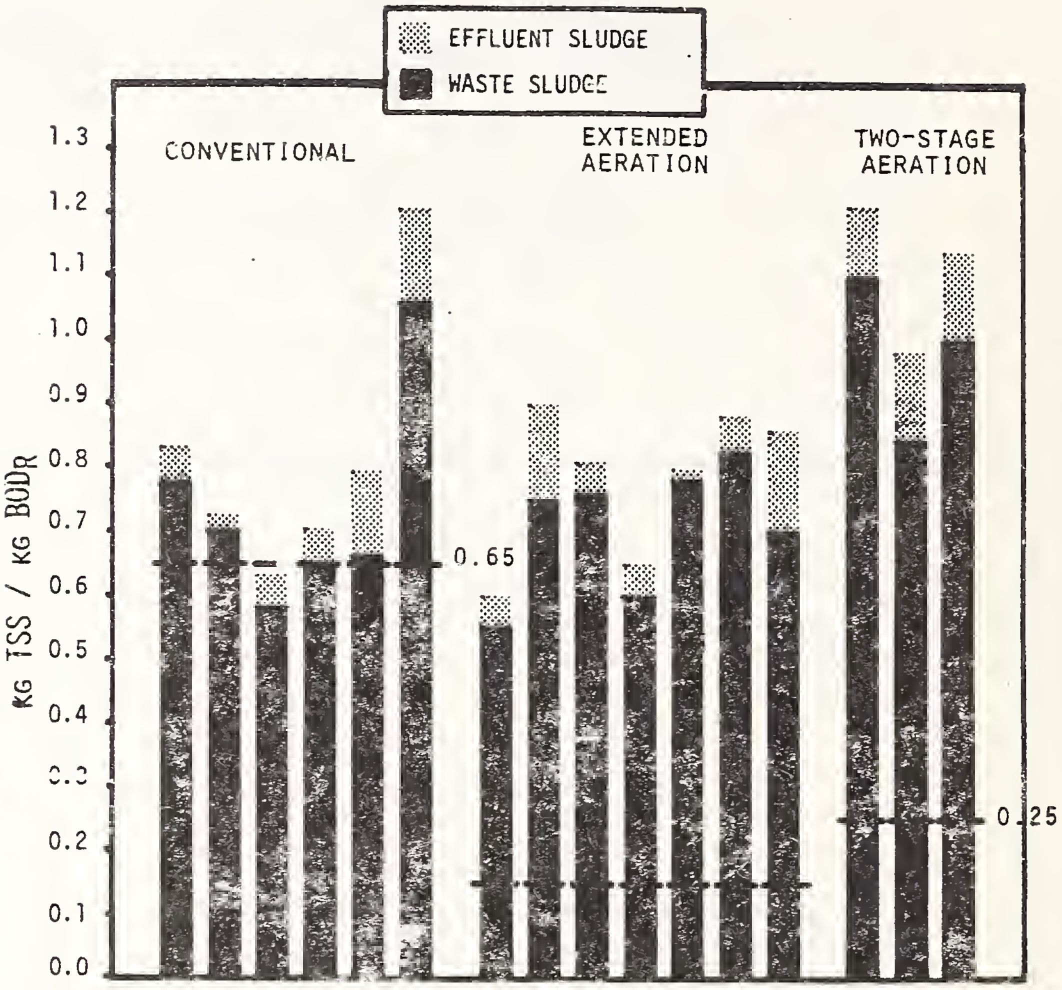


FIGURE 3:

ACTUAL SLUDGE PRODUCTION COEFFICIENTS WERE SIGNIFICANTLY HIGHER THAN TYPICAL SLUDGE YIELD COEFFICIENTS OFTEN MISUSED FOR DESIGN.

Treatment Plant Construction Continues

Throughout the fury of the federal budget cutting process, the EPA Construction Grants Program has survived (at least temporarily). Montana received their 1982 appropriation ($11.8 million) in July 1982 and their 1983 appropriation ($11.9 million) in October 1982. The Water Quality Bureau (WQB) has developed and received EPA certification for their 1983 priority list targeting 19 projects to receive these funds.

In addition to the new projects, listed below, are some projects around the state that are in various stages of completion:

BOZEMAN

Bozeman has substantially completed their $9 million activated sludge secondary treatment/ammonia removal facilities. (Visit the plant during the MSAWWA/MWPCA Conference--see conference schedule.)

LAUREL

Laurel has completed the design and is hoping to go to bid in the near future on its $5.0 million secondary treatment facility. The facility will utilize rotating biological contractors.

HAMILTON

Hamilton has just started construction on its $3.6 million oxidation ditch replacing the primary treatment facility.

ENNIS

Ennis is designing a $600,000 expansion to its lagoon system.

THREE FORKS

Three Forks has completed its $1.2 million lagoon/rapid infiltration system eliminating the largest discharge of raw municipal wastewater to Montana state waters.

TOWNSEND

Townsend has completed its $165,000 lift station improvement project.

MISSOULA

Missoula has completed approximately 50% of the construction of its new sludge handling facilities. Total project costs are $2.5 million.

EAST GLACIER

East Glacier nears completion of its $900,000 lagoon/rapid infiltration facilities.

LIBBY

Libby has started design on its $2.4 million oxidation ditch to eliminate the existing primary treatment facility.

LEWISTOWN

Lewistown has begun design on its $6.2 million secondary treatment plant. This plant will employ rotating biological contractors.

TROY

Troy has started design on its $1.9 million wastewater treatment facilities. This project includes the construction of a collection system with treatment being provided by lagoons.

WILLOW CREEK

Willow Creek has completed its $320,000 wastewater treatment facilities. These facilities include an entire collection system and package treatment plant.

HELENA

Helena is in construction of its $4.9 million wastewater treatment plant improvements. Said improvements include the construction of new primary clarification facilities, anaerobic digestion and miscellaneous other plant improvements.

COLUMBIA FALLS

Columbia falls has construction underway on its $2.0 million wastewater treatment plant expansion. The facility will be an extended aeration activated sludge facility.

RONAN

Ronan has completed its major sewer system rehabilitation project and has begun construction on its lagoon improvements. Total project costs are $1 million.

KALISPELL

Kalispell, after a long delay by EPA, appears to be near bid advertisement for its sludge handling facility. Anaerobic digesters followed by land injection of sludge will replace the purifax system. Total project costs are $2.6 million.

(cont'd)

WHITEFISH
Whitefish has completed construction and the aerated lagoons are performing well. Total project costs were $2 million.

LIVINGSTON
Livingston has completed its $3.1 million secondary treatment facility. The rotating biological contractor has been in operation for more than a year and is producing an effluent that is better than minimum secondary treatment limits.

EAST HELENA
East Helena has recently completed its $1.4 million lagoon improvements. The present facility includes aerated lagoons and an enclosed outfall line to Prickly Pear Creek.

ROY
Roy has completed the construction of a new collection system with treatment provided by lagoons followed by sprinkler irrigation. Total project costs were $400,000.

Chlorine, The Deadly Gas

portions by Al Mozingo special correspondent for Hazard Monthly

May 13, 1979 Spring Valley, California

Leak occurs on chlorine cylinder at a swimming pool. Twenty-one people hospitalized and five ambulances involved in evacuation.

July 26, 1980 Muldraugh, Kentucky

Train derailment causes escape of chlorine gas. Seven thousand five hundred people are evacuated.

February 10, 1981 Hamilton, Ontario

Truck hauling chlorine cylinders crashes. Several hundred cars on a bridge are evacuated along with nearby residences.

October 4, 1982 Columbia Falls, Montana

Leak occurs on chlorine cylinder at local swimming pool. Six blocks of homes are evacuated.

Every year incidents involving the unwanted release of chlorine gas occur. Although no fatalities were reported in conjunction with the above occurrences, the potential for death is present.

To deal with these problems effectively we need to gain knowledge and insight into the chemical itself. This can be accomplished by attending lectures, classes, courses, seminars, and by individual studying. There are a number of references that can be accessed for information on the subject. Below is information that has been researched from many different sources.

Description

Chlorine is a greenish-yellow gas with a pungent, suffocating odor. Chlorine has a production of about 24 billion pounds per year. It is one of the most common materials around. Of the top production chemicals it comes in with the top ten (actually number eight).

Chlorine is a toxic and a corrosive gas. It is largely used for water purification, bleaching, and other industrial uses. It reacts explosively or forms explosive compounds with many common chemicals. It is normally shipped in cylinders. The liquid boils at -29F and has a specific gravity of about 1.5. The gas has a vapor density of 2.5.

Fire Hazards

Chlorine is termed a nonflammable compressed gas. However, it is very reactive. It can form an explosive mixture, or vigorously supports combustion with an impressive number of materials. It may cause fire on contact with combustibles.

Life Hazards

Liquid chlorine, or high concentrations of gas, will cause serious burns to the skin and eyes. The vapors are primarily a respiratory irritant and can be fatal. It is considered a poison gas (Poison A--Department of Transportation placarding).

Reactive Hazards

Under the section of Fire Hazards, chlorine was termed very reactive. There are certain chemicals that chlorine is incompatible with. These include: ammonia, acetylene, butadiene, butane, hydrogen, sodium carbide, turpentine, finely divided metals, hydrocarbons, organic acids, phenols, amines, olefins, and benzene.

Evacuation

Determining evacuation distances can be very complex. Therefore, this article will give some guidelines that can be used. The factors that must be considered in calculating the hazard corridor of the chemical release are wind speed, temperature, cloud cover, and the angle of the sun (solar elevation angle). If the spill is a leak from a small container, drum, or cylinder (a small leak)--isolate in all directions for 250 feet. For a large spill, evacuate for 520 feet. The perimeters may require extending. One publication states: Downwind evacuation for two miles (length) and 1.3 miles wide (width).

WQB Testing for Giardia

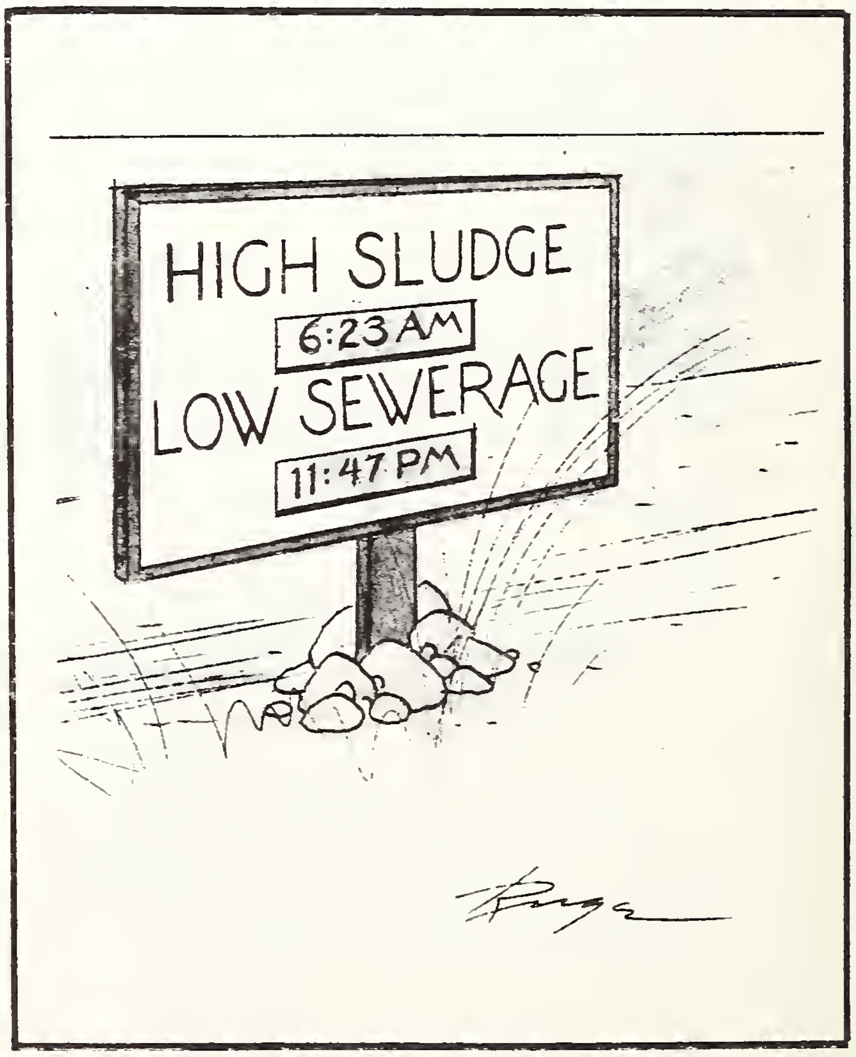
Jim Melstad
Water Quality Bureau

The Water Quality Bureau has recently obtained a supply of filters, filter housings and pumps for sampling surface water supplies for the presence of Giardia. From reading past issues of the Big Sky Clearwater, you probably know that Giardia causes giardiasis, a disease which can be transmitted through water supplies. Symptoms of giardiasis include diarrhea, abdominal cramps, fatigue and weight loss. Symptoms can be severe in certain people and require treatment. Giardia organisms are normally transmitted by warm-blooded animals that are in regular contact with a stream or lake that is utilized as a water source. Beavers are often considered to be prime suspects for causing the contamination.

Once in the water supply, the Giardia organism survives by living in a protective cyst. If the cyst is ingested by an unsuspecting human, the organism leaves the cyst and can live and multiply in the human digestive tract. The ensuing malady is hard to diagnose and the organism itself is hard to isolate in water supplies. Special equipment and large volumes of water are required.

Unfiltered surface water supplies are particularly susceptible to Giardia contamination. If you have such a supply and suspect that it may be contaminated, you can contact the Water Quality Bureau at 449-2406 and we will arrange to sample your supply.

The sampling procedure involves running a large volume of water through a filter which traps everything larger than one micron. The filtering process takes about 24 hours. During this time about 1000 gallons of water will be filtered. Hopefully if you have Giardia in your supply, it will show up in this volume of water. The filter will then be mailed to Colorado State University in Fort Collins, Colorado for analysis. The laboratory there will prepare a report which describes all of the organisms present in the sample, including Giardia if it is present. The cost of the analysis is $40.00 and you will have to pay shipping. The Water Quality Bureau also asks that you provide some manpower to assist the Water Quality Bureau staff with setting up the sampling equipment and monitoring the filtering process. The equipment must be checked every four hours during the 24 hour sampling period. Once the analysis has been completed you will receive a written report with the results.



Operators Pass the Test

On September 17, 1982 Operator Certification exams were given in Bozeman at the the conclusion of water school. The individuals listed below were successful in passing exams for full certification or operator-in-training. The type of exam passed is described by a number, a letter, and perhaps an OT. The number describes the class of the operator (all operators have been assigned a class, although some have been told that they have no class). The number is based on the complexity of the facilities or the population served. First class designates the most complex system or the highest population served. The letter describes the type of operator; A designates water distribution; B, water plant; C, wastewater plant; and D, industrial wastewater operator. The OT denotes an operator-in-training. This is someone who has passed the certification exam but has not met the experience requirements.

Class 1:

Mark Babb, Great Falls, 1C--OT
David Brown, Fort Benton, 1A--OT
Steven Cole, Conrad, 1B--OT
Les Deines, Laurel, 1A--OT
Eugene Forsyth, Forsyth, 1C--OT
David Hansen, Harlem, 1B--OT
Mark Hardy, Hardin, 1C--OT
Shelley Leistiko, Havre, 1B--OT
Larry Miller, Colstrip, 1B; 1C--OT
Robert Olsen, Billings, 1C
Thomas Ross, Billings, 1B
Jon Runnalls, Helena, 1A and 1B--OT
William Sloan, Cascade, 1A and 1B--OT
John Sutherland, Livingston, 1C

Class 2

Leslie Aarness, Billings, 2A
Larry Baker, Columbia Falls, 2A and 2B
John Caraway, Harlem, 2C--OT
Stephen Cheman, Kalispell, 2A
William Cornelius, Great Falls, 2B--OT
Roger DeHaan, Hamilton, 2A,2B and 2C
Ronald Dunn, Libby, 2C--OT
John Finley, Polson, 2B and 2C
Alan Fletcher, Columbia Falls, 2C
Dennis Foreman, Bozeman, 2C--OT
Marlene Gaither, Thompson Falls, 2B--OT
David Hansen, Harlem, 2C--OT
George Hieronymus, Hamilton, 2A
Richard Hoehne, Philipsburg, 2B--OT
Gary Huls, Trident, 2C
Daniel J. Kennedy, Forsyth, 2C--OT
Douglas Lazz, Billings, 2A
Larry Miller, Colstrip, 2A
Gene Nedved, Columbia Falls, 2A
Bruce Restad, Billings, 2A
Arlene Sherman, Trident, 2C--OT
Harry Whalen, Ronan, 2B
Thomas Wing, Helena, 2C

Class 3

William Bold, Wibaux, 3C--OT
John Caraway, Harlem, 3A--OT
Stanley Clemetson, Plentywood, 3A--OT
Nicholas V. Clos, East Helena, 3A
John Fields, Missoula, 3C
Marlene Gaither, Thompson Falls, 3A--OT
David Hansen, Harlem, 3A--OT
George Hieronymus, Hamilton, 3B
Richard Hoehne, Philipsburg, 3A--OT
Gary Huls, Trident, 3A and 3B
Danny Kamp, Bozeman, 3C
Steven Robinson, West Yellowstone, 3A and 3C--OT
Joseph Schwab, Bozeman, 3A and 3C--OT
Arlene Sherman, Trident, 3A and 3B--OT
Ronald Thomas, Big Timber, 3A
Harry Whalen, Ronan, 3A; and 3C--OT

Class 4

Floyd Balentine, Butte, 4A
Nicholas V. Clos, East Helena, 4B
Wayne Crist, Ennis, 4B and 4C
Donald Hooper, Havre, 4A and 4C
Richard Hoehne, Philipsburg, 4C
John Hutton, Kevin, 4B
Steve Ivey, Bozeman, 4A,4B and 4C--OT
Garry Jackson, Great Falls, 4A
Danny J. Kamp, Bozeman, 4A and 4B
Elbert Larsen, Moore, 4C
Brian Mehl, Decker, 4A and 4B--OT
Darrell O'Connell, Belt, 4B and 4C
Steven Patten, Belle Creek, 4A,4B and 4C--OT
Joseph Schwab, Bozeman, 4B--OT
Donald Tyler, Lima, 4A and 4B--OT
James Wilson, Butte, 4A

Stanhill's Evaporation Reduction Method

Possible Effects on Water Quality

Richard P. Howmiller

Stanhill (1) recently proposed the use of a monolayer of hydrological literature to reduce evaporation from natural waters. While the proposed method appears to be quite effective, its value in reducing evaporation may be outweighed by heretofore unconsidered deleterious effects on water quality.

Critical analyses of randomly selected papers from the hydrological literature indicate a variable but high content of bovine excrement (BX).

Accurate quantitative determination of BX content has not yet been possible but seems certain that BX accounts for at least 50 per cent of the literature. Because important resource management decisions may be imminent, we shall proceed with a discussion based on the tentative, but undoubtedly conservative, estimate of 50 per cent BX content.

When first considering the consequences of this considerable addition of organic matter, severe oxygen depletion, as is typically associated with organic pollution, seemed a serious threat. However, the BX in current papers has often been previously used in earlier publications and, in any case, it will have been intensively reworked by reviewers and even fresh BX has a relatively low biological oxygen demand (BOD). The BOD, to permanganate value for fresh BX is only about 0.2, indicating that the proportion of organic matter readily broken down by biological action is quite small (2).

A more serious consequence is the possible acceleration of eutrophication through the addition of the plant nutrients contained in BX. Acceleration of eutrophication through man's activities, often called cultural eutrophication, has been a matter of increasing concern in recent years (3.4).

Where enrichment of surface waters is desirable, e.g., to increase fish production in underdeveloped regions, the paper cover technique may have dual benefits. However, it is suggested that in these applications paper from the arts rather than the sciences be used. The BX content is significantly higher in the former and would quickly establish a state of cultural eutrophication sensu stricto (3.4).

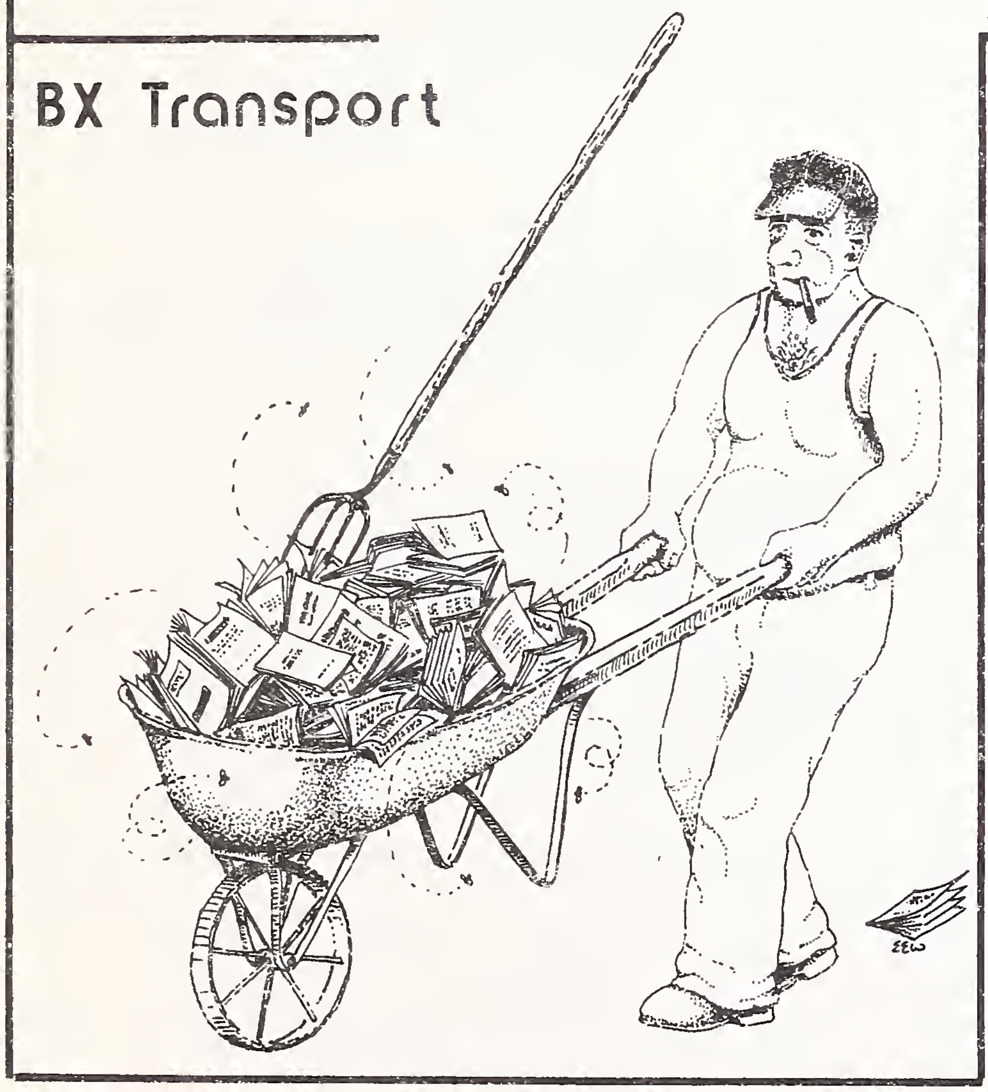
(1) Stanhill, G.A. New method of reducing evaporation. Jour. Irrepro, Res. 18:55-57, 1970.

(2) Ministry of Agriculture, Fisheries and Food, 1954, Drainage of the farm homestead. Fixed Equipment of the Farm, Leaflet 21.

(3) National Academy of Sciences, 1969, Eutrophication: Causes, Consequences, Correctives. Washington, D.C.

(4) Critic, A. 1968. What's cultural about eutrophication; Cult. . Soc. 17:121-123.

(5) Anderson, M.S. 1957. Farm Manure. pp. 229-237. in: Soil, The Yearbook of Agriculture. 1957. U.S. Government Printing Office, Washington, D.C.



Certification Exams in March

xams for certification as a Water Distribution Operator, Water Plant Operator, and Wastewater Plant Operator will be given on March 19, 1983 in Billings, Butte, Great Falls, Havre, Kalispell and Miles City. If you wish to take an exam, the Certification Office must have your application by February 28, 1983. If you haven't paid the appropriate fee for 82-83, you have to do that by February 28 also in order to take the exam in March. Those who hold temporary certificates for class 1, 2 and 3 operators must take their examinations on March 19, 1983, unless a valid reason is submitted to the Montana Board of Certification.

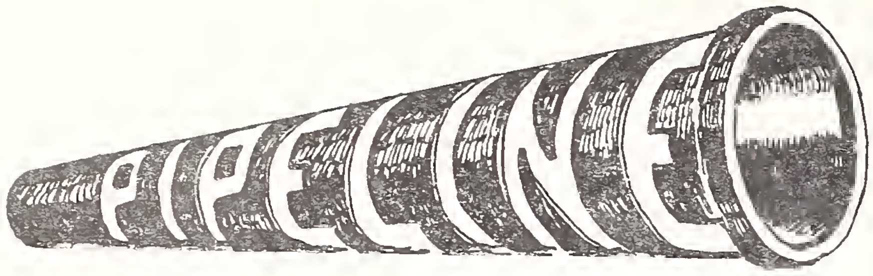
To obtain an application or if you have questions, please contact:

Rosemary Fossum
Water/Wastewater Operator
Certification
Room A206, Cogswell Bldg.
Helena, MT 59620

METCO Update

Metco, the Montana Environmental Training Coordinating Organization is now one year old. Their first year of operation was marked by inactivity. However, recent developments in the water and wastewater training fields in Montana and the availability of grant funds remaining to be used by the group, may spur more activity in the year to come.

The annual meeting of Metco will be held in conjunction with the AWWA, WPCF conference in Bozeman on Thursday evening, March 24th at the Holiday Inn. The exact time and location will be announced at the convention.



Answers

1. 5 gpm/ft. drawdown
2. 8.5 ft./sec.
3. .4 lbs./hr.
4. 16,956 gallons
5. 19.5 pounds
6. 667 pounds/day

Change at WQB Field Offices

Several changes have occurred within the Water Quality Bureau (WQB) that affect the contacts operators will have especially in our field offices. The Billings office has seen Dayton Alsaker resign to take a position as office manager for Plains Engineering in Miles City. Jerry Burns has assumed the position that was vacated by Dayton and Jerry's old position has been filled by Kathy Miller-Hoard, former operator at the Miles City Treatment Plant.

Wil Aiken remains in Kalispell as our lone representative in the "northwest territory." However, due to reductions in funding and Wil's proposed retirement, the Kalispell WQB office will be closed as of July 1, 1983. All water quality functions will be transferred to the Helena WQB office.

Also, as of November 1982, the WQB was given the responsibility for subdivision review. Presently the fate of subdivision review is in the hands of the legislature and as of this printing is undecided.

If you have any questions dealing with water treatment, wastewater treatment, water quality, water pollution control (including MPDES permits) or subdivisions, feel free to contact the WQB: Helena 449-2406, Kalispell 755-5521 or Billings 252-5697.

NMC Gets Training Grant

Northern Montana College has received a training grant from EPA through section 104(g)(1) of the Clean Water Act. The grant will be used to establish a water quality resource library at Northern Montana College and to demonstrate the effectiveness of training in improving wastewater treatment plant performance.

The library will contain resource materials for use by all operators in Montana. The materials which are presently being cataloged will include reference books, pamphlets, slide/tape shows and audio visual equipment. More information about the library is available from Martha Dow at Northern Montana College in Havre. Her phone number is (406)265-7821 ext. 3257.

The second part of the project will attempt to demonstrate the value of operator training in improving the performance of wastewater treatment facilities. A consultant specializing in wastewater operations will conduct extensive plant evaluations at four selected facilities in Montana. A training program will then be developed and implemented at the facilities. Evaluation and training methods developed during the project will later be used at other facilities in Montana to assist in performance-related problems.

Operators Certification Corner

1. The static level of a well is measured to be 35 feet below ground level. While pumping, the level is lowered to 65 feet. The flowmeter indicates that 150 gpm is being pumped. What is the specific capacity of the well?

2. If 3000 gallons per minute of water are discharged through a 12-inch pipe, find the flow velocity.

3. If 1000 gallons per minute of water is to be treated with 0.8 ppm of chlorine, how many pounds of chlorine will be required each hour?

4. A treatment plant uses filters that are 12 feet in diameter. What is the amount of wash water used per wash if the filters are backwashed at 15 gpm/sq. ft. for 10 minutes?

5. How many pounds of chlorine are there in 30 pounds of 65% calcium hypochlorite?

6. A plant effluent flowing at a rate of 4 mgd contains 20 mg/l of TSS. How many pounds of solids will be discharged per day?

A Last Minute Legislative Note

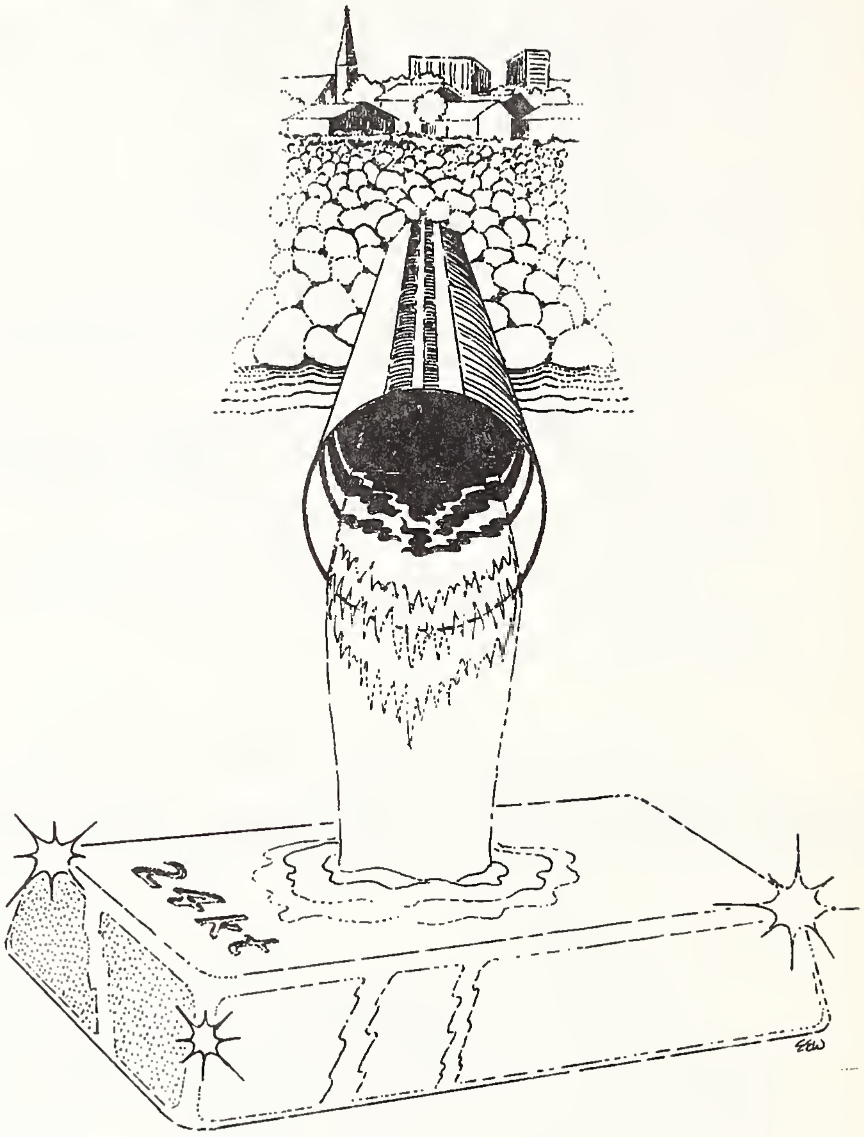
The 1977 Legislature enacted legislation terminating numerous regulatory boards and agencies, including the Board of Water and Wastewater Operators. This law, commonly referred to as the "sunset law," requires the Legislative Audit Committee to conduct a performance audit of each terminated agency. The performance audit must review the need for each regulatory board/agency and the Legislative Audit Committee must offer recommendations for board/agency reestablishment, modification, or termination. The sunset law terminates the board on July 1, 1983.

In order for the Board to continue in existence, legislation must be adopted which continues the operation of the Board. At the recommendation of the Sunset Audit Committee, House Bill 207 was introduced which would accomplish this purpose. The bill has passed the house and has been referred to the Senate Natural Resources Committee. This bill would amend the present Act and principally do the following:

1. Reestablish the Board of Water and Wastewater Operators as the Wastewater Operators' Advisory Council;
2. Clarify the advisory status of the advisory council;
3. Require the Department of Health and Environmental Sciences to hold examinations to certify operators. (This is presently a Board function.)
4. Permit the Department to establish continuing education requirements;
5. Permit the Department to issue temporary certificates.
6. Require the reporting of an operator's termination of employment;
7. Clarify the Department's disciplinary authority; and
8. Require fees commensurate with costs of operating the program.

If you would like a copy of House Bill 207 and/or if you wish to offer any comments, we suggest that you contact your representative or senator.

Our Waste as Good as Gold



It has been said that water is our most precious resource. The many uses of water are well known to us all, including its use to transport household wastes to the wastewater treatment plant. At the treatment plant we expend much effort to remove the waste and protect our precious water. A question that sometimes arises is why did we put all of that waste in the water in the first place? We in the wastewater treatment business have only recently begun to see the value in land applcation of wastewaters as fertilizers and as added moisture for plants. That which we refer to as "waste" actually does have great value. This was recognized many years ago by Victor Hugo as described below in an excerpt from Les Miserables published in 1862. (Translated by Norman Denny; Penguin Books.)

"Paris pours twenty-four million francs a year into the water. That is no metaphor. She does so by day and by night, thoughtlessly and to no purpose. She does so through her entrails, that is to say, her sewers. Twenty-five millions is the most modest of the approximate figures arrived at by statistical science.

After many experiments science today knows that the most fruitful and efficacious of all manures is human excrement. The Chinese, be it said to our shame, knew it before us. No Chinese peasant, according to Eckeberg, goes to the town without bringing back, at either end of his bamboo pole, two buckets filled with unmentionable matter; and it is thanks to this human manure that the Chinese earth is as fruitful as in the days of Abraham. The Chinese corn harvest amounts to 120 times the amount of seed. No guano is to be compared in fertility with the droppings of a town. A big city is the most powerful of dunging animals. To use the town to manure the country is to ensure prosperity. If our gold is so much waste, then, on the other hand, our waste is so much gold.

And what do we do with this golden dung? We throw it away. At great expense we send ships to the South Pole to collect the droppings of petrels and penguins, and the incalculable wealth we ourselves produce we throw back into the sea. The human and animal manure which is lost to the world because it is returned to the sea instead of to the land would suffice to feed all mankind."

NO____________

ADVANCE REGISTRATION APPLICATION

ANNUAL JOINT CONFERENCE OF MSAWWA AND MWPCA

March 24 & 25, 1983
HOLIDAY INN
5 BAXTER LANE (OFF NORTH 7th)
BOZEMAN, MONTANA

MAIL TO: A. Amirtharajah, 1983 MSAWWA-MWPCA Conference, Dept. of Civil Engineering,
Montana State University, Bozeman, MT 59717

$65.00 ____General Registration $30.00 ____Ladies Registration

(Registrations include tours, two luncheons, Get Acquainted Dinner and Awards - Dinner-Dance Parties).

Enclosed please find a check, purchase order, or warrant payable to:
1983 MSAWWA-MWPCA Conference in the amount of
$____________.

NAME____________________ TITLE____________________

UTILITY, CITY, CO.____________________

ADDRESS____________________

CITY____________________ STATE ____________ ZIP__________

IF ATTENDING: WIFE'S NAME____________________

MEMBER AWWA ☐ *MEMBER WPCF* ☐ *NON-MEMBER* ☐

THOSE REGISTERING PRIOR TO MARCH 11th WILL BE ELIGIBLE FOR FIVE CHANCES TO WIN A SAPPHIRE-SILVER NECKLACE AND EARRINGS SET.

WEDNESDAY AFTERNOON TOURS (Cost Free) 1:00 P.M. to 5:00 P.M. Tours of (1): Bozeman Wastewater Treatment Plant Construction and (2) Environmental Engineering Laboratories of Montana State University. Tours will be arranged only if a minimum of 20 persons preregister for the tours by March 11. If attending tours, please check:

Tour 1 ☐ *Tour 2* ☐

Received from: ____________________ Representing ______________

For Full Registration ____________ Other ____________ Amount: $____________

A. Amirtharajah - MSAWWA and MWPCA

By:____________________

(Receipt will be in your packet at the Conference Headquarters)

6250

Water Quality Bureau
Department of Health and
Environmental Sciences
Room A-206, Cogswell Building
Helena, Montana 59620

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